

CLAIMS

- 1 1. A system for discovering and maintaining geographic location information for
2 network sites, the system comprising:
3 a portable computing unit having a location discovery entity, a message generator
4 configured to generate network messages, and a communication facility for transmitting
5 the network messages onto a computer network; and
6 a location generator configured and arranged to determine physical coordinates
7 for its current location, the location generator coupled to the computing unit for providing
8 physical coordinates thereto;
9 whereby,
10 the discovery entity and the message generator cooperate to acquire physical co-
11 ordinates from the location generator for a given network site, and to load the acquired
12 physical coordinates into a network message, and
13 the communication facility transmits the network message containing the physical
14 coordinates to a designated intermediate network device having a plurality of ports where
15 the physical coordinates are bound to the port on which the network message is received.
- 1 2. The system of claim 2 wherein the location generator includes a Global Posi-
2 tioning System (GPS) receiver configured to communicate with a plurality of GPS satel-
3 lites for determining physical coordinates.
- 1 3. The system of claim 2 wherein
2 the location generator further includes an inertial navigation unit configured to
3 produce signals responsive to the unit being moved, the inertial navigation unit coupled
4 to the portable computing unit for providing the inertial navigation signals thereto, and
5 the discovery entity is configured to integrate the inertial navigation signals with
6 physical coordinates acquired by the GPS receiver for a substitute location to produce
7 physical coordinates for the given network site.

1 4. The system of claim 3 wherein the network message containing the physical
2 coordinates is an Internet Protocol (IP) message.

1 5. The system of claim 4 wherein the designated intermediate network device in-
2 cludes a location recording entity configured to extract the physical coordinates from the
3 network messages transmitted by the communication facility.

1 6. The system of claim 5 wherein
2 the designated intermediate network device includes a memory structure config-
3 ured to include a geographic location table having at least one entry for each port of the
4 intermediate device, and
5 the physical coordinates extracted from a network message are stored by the loca-
6 tion recording entry at the table entry for the port on which the network message was re-
7 ceived.

1 7. The system of claim 6 wherein the memory structure is a non-volatile memory
2 structure.

1 8. The system of claim 1 further comprising one or more antenna coupled to the
2 location discovery entity of the portable computing unit, the one or more antenna config-
3 ured to receive radio beacon signals from a plurality of transmitting base stations,
4 wherein
5 the radio beacon signals are encoded with the physical coordinates of the respec-
6 tive base station, and
7 the location discovery entity is configured to compute the physical coordinates for
8 its current location based on the received radio beacon signals.

1 9. The system of claim 8 wherein the location discovery entity employs triangula-
2 tion techniques to compute the physical coordinates for its current location.

1 10. A method for receiving location information in a computer network having
2 one or more network entities interconnected by one or more intermediate network de-
3 vices, the method comprising the steps of:
4 deriving physical coordinates for a location associated with a first network entity
5 of the computer network;
6 providing the physical coordinates associated with the first network entity to a
7 first intermediate network device;
8 storing the received physical coordinates at the first intermediate network device;
9 and
10 in response to a request, transmitting the stored physical coordinates to the first
11 network entity.

1 11. The method of claim 10 wherein the step of providing comprises the steps of:
2 loading the physical coordinates into one or more network messages; and
3 transmitting the one or more network messages to the first intermediate network
4 device.

1 12. The method of claim 10 wherein the first intermediate network device has a
2 port in communicating relationship with the first network entity, the method further com-
3 prising the step of binding the received physical coordinates to the port.

1 13. The method of claim 10 further comprising the step of appending the physical
2 coordinates associated with the first network entity to a 911 call originated by the first
3 network entity.

1 14. The method of claim 13 wherein the physical coordinates are appended to the
2 911 call by the first network entity.

1 15. The method of claim 13 wherein the physical coordinates are appended to the
2 911 call by the first intermediate network device.

1 16. The method of claim 10 further comprising the step of transmitting the physi-
2 cal coordinates associated with the first network entity from the first intermediate net-
3 work device to a second intermediate network device.

1 17. The method of claim 16 wherein the step of transmitting the physical coordi-
2 nates associated with the first network entity to the second intermediate network device
3 comprises the steps of:

4 generating an Internet Control Message Protocol (ICMP) message;
5 loading the physical coordinates into the ICMP message; and
6 sending the ICMP message to the second intermediate network device.

1 18. The method of claim 10 wherein the physical coordinates associated with the
2 first network entity are derived by a Global Positioning System (GPS) receiver.

1 19. The method of claim 18 wherein the physical coordinates associated with the
2 first network entity are derived by the GPS receiver in cooperation with an inertial navi-
3 gation unit.

1 20. The method of claim 10 wherein the physical coordinates associated with the
2 first network entity are derived by triangulation techniques.